RHODORA, Vol. 104, No. 919, pp. 317–322, 2002

NEBC MEETING NEWS

March 2002. Incoming President Paul Somers introduced the evening's speaker, outgoing President Dr. Lisa A. Standley. Lisa first became interested in nature as a child attending Massachusetts Audubon Society Day Camp programs. Although a premier interest in birds led her to matriculate at Cornell University, she was soon introduced to botany there by Dr. R. T. Clausen. She received a Master's degree from Cornell, her thesis being on the systematics of *Carex* sect. *Cryptocarpeae* (*C. crinita* and *C. gynandra*). She then received a Ph.D. from the University of Washington where she studied under Dr. Melinda Denton. Her doctoral thesis on *Carex* sect. *Acutae* (now better known as sect. *Phacocystis*) in the Pacific Northwest was published in the series *Systematic Botany Monographs* by the American Society of Plant Taxonomists. It is still the best-selling volume in the series. Following receipt of her doctorate, Dr. Standley taught at Wellesley College for several years before leaving academia to become a consultant with the firm of Vanasse Hangen Brustlin in Watertown, Massachusetts.

Lisa's talk, entitled "Botanizing the extremes," grew out of several visits over the past decade to two outstanding natural areas, the Anza–Borrego Desert State Park (ca. 800 square miles) in the Sonoran Desert of southern California, and the Arctic National Wildlife Refuge (ca. 28,000 square miles) in northeastern Alaska. Both refuges present extreme environments that are challenging to plants. Ranging back and forth between the two, however, shows that they are similar in some important ways.

California's Anza–Borrego Desert State Park is a harsh desert environment where extremes of heat and drought strongly control plant communities, and plants exhibit many adaptations to cope with the problems. The flora is strongly controlled by microhabitat, from cacti (species of *Mammillaria* and *Opuntia*) on parched rocky slopes to maidenhair fern (*Adiantum capillus-veneris*) near a surprisingly permanent waterfall named, appropriately, "Maidenhair Falls." Although the dryness and heat control plant distributions, some mesophytes such as desert palm (*Washingtonia filifera*), ash (*Fraxinus*), and sycamore (*Platanus*) occur in a few protected seeps and along the bottoms of moist ravines. The palms do not appear to be reproducing well at present and studies are underway to better understand the reason.

When in bloom in early spring, desert flats are extremely lush with a wide array of very showy flowers. In years when it rains, every inch of the flats has something in bloom, including species of *Pholisma*, known as "fiesta flower," *Justicia*, *Penstemon*, *Mimulus*, *Phacelia*, and *Abronia*. Composites are abundant, as are the legumes *Oxytropis* and *Astragalus*. Desert poppies (*Argemone*) and *Sphaeralcea* add bright flowers in abundance. Large specimens of *Agave* and *Yucca* are common.

Anza–Borrego is characterized by sedimentary bedrock but there are numerous granite outcrops and badlands. Dry-adapted shrubs such as creosote bush (*Larrea*), smoke-bush (*Dalea*), and mesquite (*Prosopis*) characterize large areas, as do ocotillo (*Fouquieria*) and junipers (*Juniperus*).

The plant communities of the Arctic National Wildlife Refuge have a comparable diversity, even though they occur at a high latitude and endure bitterly cold winters. Shrubby species are lacking except for a few patches of willows (*Salix*) in protected east-west valleys; down-sloping winds in the north-south valleys appear to be inimical to any woody growth other than ground-hugging species of willow (*Salix minima*) and the ubiquitous dryas (*Dryas octopetala* and *D. integrifolia*). In mid-June, the arctic meadows are filled with spectacular wild flowers in a show comparable to the spring extravaganza of the Anza–Borrego Desert State Park. There are meadows of poppies, buttercups, anemones, and lupines, and rocky uplands are characterized by "little rock gardens" with such bright flowers as purple mountain-saxifrage (*Saxifraga oppositifolia*), phlox (*Phlox sibirica*), and groundsels (*Senecio* spp.). Legumes, including the same genera found at Anza–Borrego, *Oxytropis* and *Astragalus*, are abundant. There are numerous brightly-flowered species of lousewort (*Pedicularis* spp.). Grand views of towering mountains and broad river valleys open onto the broad coastal plain and distant views of the Beaufort Sea ice pack.

Both sites have abundant wildlife. In the Sonoran Desert, the fauna is characterized by reptiles, including tortoises, rattlesnakes, and iguanas. The Arctic ecosystem features large herds of caribou, along with ermine, grizzly bears, and muskox, aptly described by Lisa as "fringed sofas on legs." Birds of the desert are few but include roadrunner (*Paenopepla*) and several species of hummingbird. In the arctic, birds are abundant and readily

observed, from gyrfalcons to long-tailed ducks to red phalaropes.

The two locales are alike in the fragility of their ecosystems, poised at the extreme edge of viability because of the harsh climatic conditions. The Anza–Borrgeo is most threatened by recreational activities of people from nearby cities, especially off-road vehicle use. The Arctic National Wildlife Refuge is too remote for that particular threat, but drilling for oil on the arctic coastal plain, where caribou calve and waterfowl nest, would threaten the basis of much of the ecosystem.

—ARTHUR V. GILMAN, Recording Secretary *pro tempore*.

June 7 Field Trip. Glenn Motzkin of the Harvard Forest and Dr. William Patterson of the University of Massachusetts, Amherst, led more than 45 Club members and guests (surely a record!) on an ecological tour of Montague Plain, Montague, Massachusetts, most of which is a preserve held by the Massachusetts Division of Wildlife and Fisheries. After Glenn's introduction to the postglacial and human history of the site, the group examined soil pits just meters apart, but separated by an old ditch-and-mound fence. One pit had a deep plow layer of homogeneous soil; it had been plowed for decades and was abandoned as a field 75–100 years ago. The overstory was *Pinus rigida*, and there were no ericads, just a few scattered herbaceous plants. The other pit had a shallow A horizon, shading into a natural B horizon, the product of 10,000 years of postglacial development. There the overstory was a mixture of hardwoods and pines with a dense understory of ericads, including *Gaylussacia baccata*, *Gaultheria procumbens*, and *Vaccinium angustifolium*. Several factors may have contributed to the limited colonization of old agricultural fields by these ericads, especially poor dispersal or establishment on xeric sites. At another site on the plain near power lines, Bill Patterson described how fire and cutting are being used to prevent succession and to thin the *Quercus ilicifolia*. These operations have had the combined effect of making the habitat more friendly to some rare moths and to human hunters. The group walked through patches that were at different stages of recovery after prescribed burns.

June 2002. Glenn Motzkin, plant ecologist at the Harvard Forest, spoke about "Historical influences on the vegetation of Massachusetts: Ecological and conservation implications." Glenn spoke about his studies and others on Montague Plain and other barren systems in the Northeast, with an emphasis on sand-plain heathlands, grasslands, pitch pine–scrub oak barrens, and ridgetop pine communities in Massachusetts. Conservation of these communities is of particular concern because they support the highest concentration of rare species in the Northeast and because most of the large barrens have shrunk during the historical period in response to succession and residential and commercial development.

Montague Plain is a sandy outwash delta, originally deposited in glacial Lake Hitchcock. Its land-use history is reflected in the soil profile and in today's vegetation (see the report on Friday's field trip). A sample of 120 plots on the plain showed three categories of plants based on their distribution today relative to plowing. Species such as *Lysimachia quadrifolia*, *Prunus serotina*, and *Lycopodium obscurum* have similar frequencies today on sites that were formerly plowed for agriculture as well as on sites that were never plowed. In contrast, species such as *Cypripedium acaule* and *Polytrichum* mosses occur much more frequently today on former agricultural lands, even though these sites have been abandoned from agricultural use for > 100 years. Areas that were never plowed are virtually the only habitats occupied by several species that are characteristic of pine barrens, including *Gaultheria procumbens*, *Gaylussacia baccata*, *Viburnum cassinoides*, *Pteridium aquilinum*, and *Quercus prinoides*. In particular, *G. procumbens* is almost entirely restricted to never-plowed land, with less than 5% of the former agricultural lands having any *G. procumbens* in the plots. *Polytrichum* species, in contrast, are restricted almost entirely to previously agricultural lands. Similar relationships between modern species distribution patterns and historical land use occur on outwash plains across the Connecticut Valley.

Studies of other barrens systems in coastal Massachusetts (Martha's Vineyard, outer Cape Cod, and Nantucket), Block Island, and Long Island show similar patterns of species segregation with past agricultural use, but several of the plant species differ from the inland barrens. The coastal suite of plants that indicates formerly plowed or otherwise disturbed land includes

Pinus rigida, *Deschampsia flexuosa*, and *Arctostaphylos uva-ursi*. Sediment cores from several studies suggest that grasslands were less common before European settlement than during the historical period. Ridgetop barrens (such as Mount Tekoa or Mount Everett in Massachusetts) also are dominated by *P. rigida*. Ridgetop barrens typically occur in areas with little soil and harsh growing conditions; whereas some sites have experienced frequent fire, others have been influenced by frequent ice storms.

To maintain or restore barrens systems, active management may be necessary in order to simulate the effects of the disturbances that allowed these communities to develop, including prescribed fire, mowing, and grazing. Although many barrens originated during the historical period from overgrazing or other severe disturbances, they now harbor numerous rare species. As Glenn said, a legitimate question is, "What are appropriate objectives for these systems?" We frequently choose to manage for early successional habitats, although it may not be possible to maintain every rare species or unusual tree form.

—Joann M. Hoy, Recording Secretary *pro tempore*.

June 8 Field Trip. The Saturday field trip to South River State Forest in Conway, Massachusetts, was led by Jesse Bellemare, a graduate student at Harvard Forest. This trip provided the opportunity to explore the flora of the rich mesic forest, and to see the effect of past land use on its herbaceous layer. Jesse just completed his Master's thesis on the effects of historic land use on herbaceous plant diversity in rich mesic forests in western Franklin and Hampshire Counties, and the South River State Forest was one of his study sites. The site is on Waits River Formation bedrock that includes outcrops of limestone and marble and some calcareous seeps. The Conway area was settled in the late 1700s, and by the early 1800s 75–85% of the land was cleared and much of it was converted to sheep pasture. The state park includes land that was maintained as a sugar bush and never cleared, as well as land that was cleared for pasture and then abandoned in the early 20th century, and has since regenerated to secondary forest. The difference in herbaceous species diversity between the areas with different land use histories was dramatic. The area that had never been cleared had an impressive diversity of herbaceous plants while the reverting pasture had

very few herbaceous species and those we did see were widely scattered. Jesse suggested that the difference in diversity was due to two factors. Many of the herbaceous plants of the rich mesic woods are either ant-dispersed or drop-dispersed and so have limited dispersal ability. This, combined with their lack of a persistent soil seed bank, makes these plants slow to recolonize secondary forest. He also suggested that a second factor limiting successful colonization was related to the low light levels produced by the almost closed canopy of the young sugar maples.

Although the trip was a little late for the earliest spring flowers, we still saw many of the herbaceous plants that are characteristic of rich mesic forest. The forest was dominated by *Acer saccharum* but included *Fraxinus americana*, *Carya cordiformis*, *Betula alleghaniensis*, and *Fagus grandifolia*. We also found one large individual of *Ulmus rubra*. The uncut primary forest area was rich in ferns including *Matteucia struthiopteris*, *Dryopteris goldiana*, *Diplazium pycnocarpon*, and *Deparia acrostichoides*, all characteristic of rich mesic woods. Other ferns included *Dryopteris intermedia* and the hybrid *Dryopteris triploidea*. Herbaceous plants included *Carex plantaginea*, *Laportia canadensis*, *Osmorhiza claytonii*, *Tiarella cordifolia*, *Dicentra canadensis* (identifiable by its yellow corms), *Actaea pachypoda*, *Caulophyllum thalictroides*, *Viola canadensis*, *Trillium erectum*, and *Cardamine diphylla*. We were lucky enough to spot *Panax quinquefolius* and two Massachusetts State Watch-list species, *Sanicula trifoliata* and *Cardamine* ×*maxima*. The site also had some interesting bryophytes. Susan Williams also found *Freullania bolanderi* at what appears to be its southernmost station and *Cyrto-hypnum minutulum* (*Thuidium minutulum*), which is a new county record.

—Karen B. Searcy, Recording Secretary *pro tempore*.